

What is claimed is:

1. An isolated FB005 peptide comprising the sequence of SEQ ID NO: 1.
2. An isolated FB006 peptide comprising the sequence of SEQ ID NO: 2.
3. An isolated FB066 peptide comprising the sequence of SEQ ID NO: 7.
4. An isolated, modified peptide selected from the group consisting of:

- (a) SEQ ID NO:1;
- (b) SEQ ID NO:2;
- (c) SEQ ID NO:3; and
- (d) SEQ ID NO:7,

and having at least one substituted amino acid residue at a predetermined position in the peptide sequence, wherein the at least one substituted amino acid residue is a hydrophilic amino acid residue, a hydrophobic amino acid residue, an amino acid residue having a propensity to form alpha helices, a D-isomer of one of the naturally occurring L-amino acids, or a non-naturally occurring amino acid residue.

5. An isolated, derivatized peptide selected from the group consisting of:
  - (a) the FB005M peptide of SEQ ID NO:8;
  - (b) the FB005CM peptide of SEQ ID NO:9;
  - (c) the FB006M peptide of SEQ ID NO:10;
  - (d) the FB007M peptide of SEQ ID NO:11;
  - (e) the FB010M peptide of SEQ ID NO:12;
  - (f) the FB010KM peptide of SEQ ID NO:13;
  - (g) the FB066M peptide of SEQ ID NO:14; and
  - (h) the FB066KM peptide of SEQ ID NO:15.

6. An isolated, derivatized peptide selected from the group consisting of:

(a) SEQ ID NO:1;

(b) SEQ ID NO:2;

(c) SEQ ID NO:3; and

(d) SEQ ID NO:7,

wherein predetermined amino acid residues in the peptide sequence are derivatized by conjugating a coupling group to said predetermined amino acid residues.

7. The modified peptide of claim 4, wherein predetermined amino acid residues in the peptide sequence are derivatized by conjugating a coupling group to said predetermined amino acid residues.

8. The isolated peptide of claim 1, wherein the peptide is derivatized by attaching a coupling group to a lysine, said lysine being substituted for glutamic acid at position 23 or added at the C-terminus.

9. The isolated peptide of claim 2, wherein the peptide is derivatized by attaching a coupling group to the lysine at position 13.

10. The isolated peptide of claim 2, wherein the peptide is modified by substituting the lysine at position 13 with glutamic acid and derivatized by attaching a coupling group to an additional lysine residue added at the C-terminus.

11. An isolated, derivatized peptide consisting of the sequence of SEQ ID NO: 3, wherein the peptide is modified by replacing glutamic acid at position 13 with a lysine and attaching a coupling group to the lysine, or derivatized by conjugating a coupling group to a lysine added at the C-terminus.

12. The isolated peptide of claim 3, wherein the peptide is derivatized by attaching a coupling group to the lysine at position 13, or to an additional lysine added at the C-terminus.
13. The derivatized peptide of any one of claims 5-12, wherein the coupling group is selected from the group consisting of:
  - (a) a maleimido group;
  - (b) a succinimidyl group;
  - (c) a hydrazine group; and
  - (d) a carbonyl group.
14. The derivatized peptide of claim 13, wherein the maleimido group is 3'-maleimidopropionate connected to the epsilon amino group of lysine by [2-(2-amino)ethoxyl]ethoxy acetic acid.
15. A pharmaceutical composition comprising the peptide of any one of claims 1-4 or the derivatized peptide of any one of claims 5-12.
16. A conjugate comprising the derivatized peptide of any one of claims 5-12 conjugated to a blood component.
17. The conjugate of claim 16, wherein the blood component is selected from the group consisting of:
  - (a) human serum albumin protein;
  - (b) human transferrin protein;
  - (c) human ferritin protein;
  - (d) human immunoglobulin proteins;
  - (e) human ferritin protein;

- (f) human  $\alpha$ -2-macroglobulin protein;
  - (g) human thyroxin binding protein;
  - (h) human steroid binding proteins; and
  - (i) combinations thereof.
18. A method for reducing infection of mammalian cells by a virus comprising presenting a peptide according to any one of claims 1-4 or a peptide derivative according to any one of claims 5-12 to said mammalian cells.
19. A method for preventing infection of mammalian cells by a virus comprising presenting a peptide according to any one of claims 1-4 or a peptide derivative according to any one of claims 5-12 to said mammalian cells.
20. A method for preventing viral replication in mammalian cells by a virus comprising presenting a peptide according to any one of claims 1-4 or a peptide derivative according to any one of claims 5-12 to said mammalian cells.
21. The method of claims 18-20, wherein said peptide is presented in the presence of said virus.
22. The method of claims 18-21, wherein the virus is selected from the group consisting of:
- (a) human immunodeficiency virus (HIV); and
  - (b) simian immunodeficiency virus (SIV).
23. The method of claims 18-21, wherein the peptide or peptide derivative is administered orally, topically, intravascularly, intraarterially, intramuscularly, or subcutaneously.
24. The method of claims 18-21, wherein the peptide or peptide derivative is co-administered with one or more additional HIV treatment(s).

25. The method of claim 24, wherein the said one or more additional HIV treatment(s) comprises at least one other variant gp41 peptide.

26. The method of claim 24, wherein the additional HIV treatment(s) is selected from the group consisting of:

(a) AGENERASE;

(b) COMBIVIR;

(c) CRIXIVAN;

(d) EMTRIVA;

(e) EPIVIR;

(f) FORTOVASE;

(g) HIVID;

(h) INVIRASE;

(i) KALETRA;

(j) NORVIR;

(k) RESCRIPTOR;

(l) RETROVIR;

(m) REYATAZ;

(n) SUSTIVA;

(o) TRIZIVIR;

(p) VIDEX EC;

(q) VIDEX;

(r) VIRACEPT;

(s) VIRAMUNE;

- (t) VIREAD;
- (u) ZERIT; and
- (v) ZIAGEN.

27. The method of claims 18-21, wherein the virus is HIV and the mammalian cells are human cells.
28. A method of preventing or reducing HIV infection comprising administering a derivative variant gp41 peptide of any one of claims 5-12 to a patient whose cells have been exposed to HIV, wherein said peptide derivative conjugates with a blood component of said patient, thereby extending the half-life of the peptide in said patient's blood.
29. A method of making an antiviral conjugate comprising mixing derivatized variant gp41 peptide(s) with blood components and allowing the formation of covalent bonds between derivatized variant gp41 peptide and blood components.
30. The method of claims 27-28, wherein the blood component is selected from the group consisting of:
- (a) human serum albumin protein;
  - (b) human transferrin protein;
  - (c) human ferritin protein;
  - (d) human immunoglobulin proteins;
  - (e) human ferritin protein;
  - (f) human  $\alpha$ -2-macroglobulin protein;
  - (g) human thyroxin binding protein;
  - (h) human steroid binding proteins; and
  - (i) combinations thereof.

31. The method of claim 29, wherein the blood component is human serum albumin protein.
32. The method of claims 27-28, wherein the conjugation occurs *in vivo*.
33. The method of claims 27-28, wherein the conjugation occurs *ex vivo*.
34. The method of claim 32, wherein the blood component(s) are separated by plasmaphoresis before conjugation to the derivatized peptide.
35. A pharmaceutical composition comprising the isolated peptide of claims 1-14 and a pharmaceutically acceptable carrier.
36. A method for the generation of peptides having anti-viral, virostatic or anti-fusogenic activity comprising:
- (a) screening a viral virulence protein(s) to identify sequences thereof having alpha-helical forming propensities;
  - (b) designing an altered peptide by modifying or derivatizing at least one amino acid residue(s) of said identified sequence;
  - (c) synthesizing said altered peptides; and
  - (d) testing said peptides to verify anti-viral, virostatic or anti-fusogenic activity.